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EXAMINER				
PILKINGTON, JAMES				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/567,139

Applicant(s)

MARTIN ET AL.

Examiner

JAMES PILKINGTON

Art Unit

3656

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2010.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 10 and 12-23 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-7, 10 and 12-23 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/GS-08)
Paper No(s)/Mail Date 12/9/09 4/2/10
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 2, 2010 has been entered.

Claim Objections

Claims 7, 14 and 15 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claims 7, 14 and 15 repeat the clause stated in independent claims 1 (lines 10-14) and 10 (lines 14-16). In particular, claims 14 and 15 positively recite less structure than that which is claimed in claims 1 and 10 rendering their overall claim scope unclear. Is the Applicant only attempting to claim a low friction agent in claims 14 and 15? If so, reference to claims 1 and 10 should be removed from these claims since such a reference incorporates all that which is claimed in claims 1 and 10.

Claim Rejections - 35 USC § 112

Claims 1-7, 10 and 12-23 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1, 10, 16, 17 and 18 recite the limitation "wherein the carboxylic acids exclude saturated dicarboxylic acid." As original filed the specification did not exclude the use of saturated dicarboxylic acid, in fact paragraph 0078 states that either saturated or unsaturated dicarboxylic acids can be used. The new added language excluding the use of saturated dicarboxylic is divergent from the original disclosure and is deemed new matter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 7, 10, 12-15, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pope, USP 6,655,845 in view of Rubin, USP 5,064,547 and further in view of Pragnell, USP 5,681,506.

Pope discloses a low-friction sliding mechanism wherein:

- the DLC coated sliding member (races in Figures 2H-1, 2H-2 and 2K-1) is formed by coating diamond-like carbon on a base material (polycrystalline diamond, PDC);

- the sliding member (roller in Figure 2K-1) is formed with at least one kind of material selected from a group consisting of a metal material, a non-metal material and a coated material obtained by coating a thin film on a surface of the metal material or the non-metal material (roller is coated with PDC, cfm 2)

Pope does not disclose the use of a low-friction agent composition that contains at least one kind selected from a group consisting of an oxygen-containing organic compound (C) and an aliphatic amine compound (D) between the two sliding members, wherein the oxygen-containing organic compound is a carboxylic acid and is contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition.

Rubin teaches a low-friction agent composition (lubricant) that contains an oxygen-containing organic compound which is a carboxylic acid (dicarboxylic acid, dimer acids, polycarboxylic acid, see C6/L40-68) and is contained in a range of 0.05 to 3.0% by mass (weight, C4/L50-59) for the purpose of providing a lubricant with corrosion inhibiting properties (C5/L66-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide a low-friction agent composition that contains an oxygen-containing organic compound of carboxylic acid in a range of 0.05-3% of the total mass amount of low-friction agent composition, as taught by Rubin, for the purpose of providing a lubricant with corrosion inhibiting properties.

Pope in view of Rubin does not disclose that the carboxylic acid excludes saturated carboxylic acid.

Pragnell discloses that either a saturated or unsaturated dicarboxylic acid can be used in a low-friction agent (lubricant, see column 1 lines 52-53) for the purpose of providing a lubricant with anti-corrosion properties (column 1 lines 35-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the lubricant of Rubin and use an unsaturated dicarboxylic acid, as taught by Pragnell, since the substitution of a saturated dicarboxylic acid for an unsaturated dicarboxylic acid yields the predictable result of maintaining an anti-corrosion property of the lubricant.

Claims 1, 2, 10 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pope, USP 6,655,845 in view of Buckley III, UPS 5,108,633.

Pope discloses a low-friction sliding mechanism wherein:

- the DLC coated sliding member (races in Figures 2H-1, 2H-2 and 2K-1) is formed by coating diamond-like carbon on a base material (polycrystalline diamond, PDC);
- the sliding member (roller in Figure 2K-1) is formed with at least one kind of material selected from a group consisting of a metal material, a non-metal material and a coated material obtained by coating a thin film on a surface of the metal material or the non-metal material (roller is coated with PDC (clm 2))

Pope does not disclose the use of a low-friction agent composition that contains at least one kind selected from a group consisting of an oxygen-containing organic compound (C) and an aliphatic amine compound (D) between the two sliding members, wherein the aliphatic amine compound has a hydrocarbon group having 6-30 carbon atoms and is contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition.

Buckley III teaches a low-friction agent composition (lubricant, C4/L36-47) that contains an aliphatic amine compound (C12/L5-37), wherein the aliphatic amine compound has a hydrocarbon group having 6-30 carbon atoms (C6-C12 disclosed, see C12/L5-37) and is contained in a range of 0.05 to 3.0% (weight, C12/L5-37) for the purpose of providing dispersancy and/or detergency to the lubricant (C4/L36-47).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide a low-friction agent composition that contains an aliphatic amine compound, wherein the aliphatic amine compound has a hydrocarbon group having 6-30 carbon atoms and is contained in a range of 0.05 to 3.0% by mass, as taught by Buckley III, for the purpose of providing dispersancy and/or detergency to the lubricant.

Claims 3-6, 16-18 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pope, USP 6,655,845 in view of Rubin, USP 5,064,547 and Pragnell, USP 5,681,506, and further in view of Veerasamy, USP 7,067,175.

Regarding claims 3-6, Pope discloses all of the claimed subject matter as applied to claim 1 above.

Pope does not disclose that the DLC has a hydrogen content of 20 percent or less, in particular an a-C diamond like carbon with no hydrogen.

Veerasamy teaches a DLC which is an a-C diamond like carbon (ta-C) which does not contain hydrogen (C8/L35-36) for the purpose of repelling water and reducing corrosion (C1/L15-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide for the DLC to have a hydrogen content of 20 percent or less, in particular an a-C diamond like carbon with no hydrogen, as taught by Veerasamy, for the purpose of repelling water and reducing corrosion.

Regarding claims 16-18 and 21-23, Pope discloses a low-friction sliding mechanism wherein:

- the DLC coated sliding member (races in Figures 2H-1, 2H-2 and 2K-1) is formed by coating diamond-like carbon on a base material (polycrystalline diamond, PDC);
- the sliding member (roller in Figure 2K-1) is formed with at least one kind of material selected from a group consisting of a metal material, a non-metal material and a coated material obtained by coating a thin film on a

surface of the metal material or the non-metal material (roller is coated with PDC (clm 2)

Pope does not disclose the use of a low-friction agent composition that contains at least one kind selected from a group consisting of an oxygen-containing organic compound (C) and an aliphatic amine compound (D) between the two sliding members, wherein the oxygen-containing organic compound is a carboxylic acid and is contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition.

Rubin teaches a low-friction agent composition (lubricant) that contains an oxygen-containing organic compound which is a carboxylic acid (dicarboxylic acid, dimer acids, polycarboxylic acid, see C6/L40-68) and is contained in a range of 0.05 to 3.0% by mass (weight, C4/L50-59) for the purpose of providing a lubricant with corrosion inhibiting properties (C5/L66-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide a low-friction agent composition that contains an oxygen-containing organic compound of carboxylic acid in a range of 0.05-3% of the total mass amount of low-friction agent composition, as taught by Rubin, for the purpose of providing a lubricant with corrosion inhibiting properties.

Pope in view of Rubin does not disclose that the carboxylic acid excludes saturated carboxylic acid.

Pragnell discloses that either a saturated or unsaturated dicarboxylic acid can be used in a low-friction agent (lubricant, see column 1 lines 52-53) for the purpose of providing a lubricant with anti-corrosion properties (column 1 lines 35-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the lubricant of Rubin and use an unsaturated dicarboxylic acid, as taught by Pragnell, since the substitution of a saturated dicarboxylic acid for an unsaturated dicarboxylic acid yields the predictable result of maintaining an anti-corrosion property of the lubricant.

Pope does not disclose that the DLC has a hydrogen content of 10 percent or less, in particular an a-C diamond like carbon with no hydrogen.

Veerasamy teaches a DLC which is an a-C diamond like carbon (ta-C) which does not contain hydrogen (C8/L35-36) for the purpose of repelling water and reducing corrosion (C1/L15-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide for the DLC to have a hydrogen content of 10 percent or less, in particular an a-C diamond like carbon with no hydrogen, as taught by Veerasamy, for the purpose of repelling water and reducing corrosion.

Claims 3-6 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pope, USP 6,655,845 in view of Buckley III, UPS 5,108,633 and further in view of Veerasamy, USP 7,067,175.

Regarding claims 3-6, Pope in view of Buckley III, as applied to claim 1 above, does not disclose that the DLC has a hydrogen content of 20 percent or less, in particular an a-C diamond like carbon with no hydrogen.

Veerasamy teaches a DLC which is an a-C diamond like carbon (ta-C) which does not contain hydrogen (C8/L35-36) for the purpose of repelling water and reducing corrosion (C1/L15-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide for the DLC to have a hydrogen content of 20 percent or less, in particular an a-C diamond like carbon with no hydrogen, as taught by Veerasamy, for the purpose of repelling water and reducing corrosion.

Regarding claims 16-18, Pope discloses a low-friction sliding mechanism wherein:

- the DLC coated sliding member (races in Figures 2H-1, 2H-2 and 2K-1) is formed by coating diamond-like carbon on a base material (polycrystalline diamond, PDC);
- the sliding member (roller in Figure 2K-1) is formed with at least one kind of material selected from a group consisting of a metal material, a non-

metal material and a coated material obtained by coating a thin film on a surface of the metal material or the non-metal material (roller is coated with PDC (clm 2))

Pope does not disclose the use of a low-friction agent composition that contains at least one kind selected from a group consisting of an oxygen-containing organic compound (C) and an aliphatic amine compound (D) between the two sliding members, wherein the aliphatic amine compound has a hydrocarbon group having 6-30 carbon atoms and is contained in the range of 0.05 to 3.0% relative to the total mass amount of low-friction agent composition.

Buckley III teaches a low-friction agent composition (lubricant, C4/L36-47) that contains an aliphatic amine compound (C12/L5-37), wherein the aliphatic amine compound has a hydrocarbon group having 6-30 carbon atoms (C6-C12 disclosed, see C12/L5-37) and is contained in a range of 0.05 to 3.0% (weight, C12/L5-37) for the purpose of providing dispersancy and/or detergency to the lubricant (C4/L36-47).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide a low-friction agent composition that contains an aliphatic amine compound, wherein the aliphatic amine compound has a hydrocarbon group having 6-30 carbon atoms and is contained in a range of 0.05 to 3.0% by mass, as taught by Buckley III, for the purpose of providing dispersancy and/or detergency to the lubricant.

Pope also does not disclose that the DLC has a hydrogen content of 10 percent or less, in particular an a-C diamond like carbon with no hydrogen.

Veerasamy teaches a DLC which is an a-C diamond like carbon (ta-C) which does not contain hydrogen (C8/L35-36) for the purpose of repelling water and reducing corrosion (C1/L15-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Pope and provide for the DLC to have a hydrogen content of 10 percent or less, in particular an a-C diamond like carbon with no hydrogen, as taught by Veerasamy, for the purpose of repelling water and reducing corrosion.

Double Patenting

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Applicant is advised that should claims 4-6 be found allowable, claims 16-18 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim.

See MPEP § 706.03(k). Since claims 4-6 depend directly from claim 1 and claims 16-18 claim all the limitations of claim 1, with the addition of the limitations found in claims 4-6, claims 16-18 are identical to claims 4-6.

Response to Arguments

Applicant's arguments with respect to claim 1 and Rubin only disclosing saturated dicarboxylic acid have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed April 2, 2010 have been fully considered but they are not persuasive.

With regards to the Applicant's argument that the objection to claims 14 and 15 is improper because claims 14 and 15 only recite a low friction agent: As stated in the prior office action, claims 14 and 15 incorporate all the claim limitations of claims 1 and 10 with the recitation "according to claim 1" or "according to claim 10." If the Applicant's intent is to have the claims only recite and/or require the composition of the low-friction agent then the preamble should read - -A low-friction agent composition that is used in a low friction sliding mechanism, the low-friction agent comprising:- -

Regarding the rejections under 35 USC 103: the Applicant argues that (A) none of the references teach the combination of a diamond-like carbon and a low friction agent as claimed, (B) there is no motivation to combine the references and (C) that

there is no showing that it would have been expected that the combination of the references would have provided the unexpected results discovered by the Applicant (see items 2 and 3 in Remarks).

Pope discloses the use of polycrystalline diamond on the bearing raceway/sliding surfaces. Polycrystalline diamond is a DLC (diamond-like carbon) material.

In addition, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The examiner also recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, motivation is found in Rubin in column 5 lines 66-68 where it states that the lubricant provides a corrosion inhibiting property to the device, Buckley III states in column 4 lines 36-47 that the low-friction agent is used to provide a lubricant with adequate dispersancy and/or detergency which would improve bearing life and Veerasamy discloses that using the

particular a-C diamond provides a water repelling property to the assembly in column 1 lines 15-21.

Finally, a mere allegation of unexpected result is not a proper showing of such. If the Applicant wishes to rely on unexpected results the evidence should be submitted by 37 CFR 1.132. The specification lists comparative examples but there is no disclosure in these examples as to what was the expected result of using the claimed low friction agent in relation to what actually happened.

The Applicant argues in item 4 of the Remarks that Buckley III discloses long chain amines having at least 50 carbon atoms which is outside the claimed range of 6-30 carbon atoms.

Buckley III does indeed say that one of the preferred long chain amines has at least 50 carbon atoms, however Buckley III also discloses that the carbon lengths used in lubricating oil can also be between 6 and 12 when employing synthetic oil, see column 12 lines 5-37. Since the claim does not distinguish between natural and synthetic oil, Buckley III discloses the limitation of 6-12 carbon atoms.

The Applicant argues that Veerasamy is not a valid teaching for an a-C coating since the use of the coating of Veerasamy is different from that of the instant application and none of the references disclose the use of the claimed low-friction agent with a DLC coating.

First, the purpose of applying an a-C coating in a prior art references does not need to be the same as that in the instant application. Because Veerasamy uses the coating for another reason does not mean it won't perform the same as that of the instant application nor does it mean that one of ordinary skill in the art would not be motivated to apply the coating to a sliding member. One of ordinary skill in the art would be motivated to add an a-C coating since Veerasamy discloses that useful benefits are repelling water and reducing corrosion, see column 1 lines 15-21 of Veerasamy.

Also, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES PILKINGTON whose telephone number is (571)272-5052. The examiner can normally be reached on Monday - Friday 7-3.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JAMES PILKINGTON/
Examiner, Art Unit 3656
4/14/10